Name:

1. func-4-5: Consider the following code:

```
def square(x):
    for counter in range(x-1):
        runningtotal = x
        runningtotal = runningtotal + x
    return runningtotal
```

What happens if you put the initialization of `runningtotal` (the line `runningtotal = x`) inside the for loop as the first instruction in the loop?

Answer: the function will return x+x (that gets calculated at every step)

2. Rewrite the following problems using an indefinite while-loop: `factorial(n)`, `sumTo(n)`, `power(n,p)`   `countVowels(word)`

`def factorial(n):`	`n!= 1*2*3* … *n`
`def sumTo(n):`	`sumTo(n)= 1+2+3+ … + n`
`def power(n, p):`	`power(n, p)= n*n* … *n (p-times)`
`def countVowels(word):`	`countVowels("halloween") -> 4`

Answers:

```
def factorial(n):
  counter=1
  fact_accu=1
  while counter <= n:
    fact_accu *= counter
    counter += 1
  return fact_accu
```

```
def power(n,p):
  counter=1
  power_accu=1
  while counter <= p:
    power_accu *= n
    counter += 1
  return power_accu
```

```
def sumTo(n):
  counter=1
  sum_accu=1
  while counter <= n:
    sum_accu += counter
    counter += 1
  return sum_accu
```

```
def countVowels(word):
  char_counter=0
  vowel_counter=0
  while char_counter < len(word):
    if word[char_counter] in "aeiouAEIOU":
      vowel_counter+=1
    char_counter += 1
  return vowel_counter
```

3. Write a function to find greatest common divisor (GCD) or highest common factor (HCF) of two numbers. For example, `gcd(18,12) = 6`

```python
def gcd(left, right):
    gcd_value = 1
    divisor = 1
    while divisor <= right:
        if left % divisor == 0 and right % divisor == 0:
            gcd_value = divisor
        divisor += 1
    return gcd_value
```

4. p9-1: What is the result of executing the following code?

```python
number = 0
while number <= 0:
    if number < 0:
        number = number + 1
    print(number)
```

Answer: 0 x infinite times (infinite loop)

5. What is the following code going to print:

```python
numbers = [3, 0, 2]
cnt = 0
for i in numbers:
    for j in range(i):
        print('iteration', cnt, end=': ')
        print(j)
        cnt = cnt + 1
```

Answer: iteration 0: 0
           iteration 1: 1
           iteration 2: 2
           iteration 3: 0
           iteration 4: 1

6. What is the following code going to print:

```python
numbers = [3, 0, 2]
cnt = 0
for i in numbers:
    cnt = 0
```

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```
        for j in range(i):
            print('iteration', cnt, end=': ')
            print(j)
            cnt = cnt + 1
```

Answer: iteration 0: 0
              iteration 1: 1
              iteration 2: 2
              iteration 0: 0
              iteration 1: 1

7. What is the following code going to print:

```
numbers = [3, 0, 2]
cnt = 0
for i in numbers:
    cnt = cnt - 1
    for j in range(i):
        print('iteration', cnt, end=': ')
        print(j)
        cnt = cnt + 1
```

Answer: iteration -1: 0
              iteration 0: 1
              iteration 1: 2
              iteration 0: 0
              iteration 1: 1

8. What does this following code print:

```
size = 2
for i in range(size+1):
    print("i", end=" ")
    for j in range(i):
        print("duck", end=" ")
    print("goose")
    print("--" + "-" * i)
```

Answer: i goose

              --

              i duck goose

              ---

              i duck duck goose

              ----

9. Split the following code in 2 utility-function `get_month()` and `get_day()` and a `main()` function that gets the input from the user and does the printing:

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```python
date = input('Date: ')  #January, 25
zodiac = input('Zodiac: ') #Rat
digits = ""
letters = ""
for char in date:
    if (char > '0' and char < '9'):
        digits = digits + char
    else:
        letters = letters + char
double = "20" * 2
print(digits, letters, double)
print("Year of the "+zodiac)
```

Answer:
```python
def get_month(date):
    letters = ""
    for char in date:
        if not (char > '0' and char < '9'):
            letters = letters + char
    return letters

def get_day(date):
    digits = ""
    for char in date:
        if (char > '0' and char < '9'):
            digits = digits + char
    return digits
def main():
    date = input('Date: ')  #January, 25
    zodiac = input('Zodiac: ') #Rat
    double = "20" * 2
    print(get_day(date), get_month(date), double)
    print("Year of the "+zodiac)
```

10. What does this following code print:

```python
for i in range(1,4):
    print(i, 'produces', i ** 2)
    for j in range(i ** 2, i, -2):
        if (j % 3 == 0):
            print(str(j) + ' is divisible by 3')
        else:
            print(str(j) + ' is not')
        print('step i done')
```

Answer:
1 produces 1
2 produces 4

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11. Correct this following program so that it reads the first non-empty user input:

```
count=0
user_input=input('type your input: ')
while user_input == "" or count < 1:
    count+=1
    user_input=input('type your input: ')
```

Answer:

```
user_input=input('type your input: ')
while user_input == "":
    user_input=input('type your input: ')
```